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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/557,608	11/22/2005	Atsushi Tamura	1422-0695PUS1	6205
2292 7590 02/10/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
WEBB, GREGORY E				
ART UNIT		PAPER NUMBER		
1796				
NOTIFICATION DATE		DELIVERY MODE		
02/10/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

### Office Action Summary

**Application No.**

10/557,608

**Applicant(s)**

TAMURA ET AL.

**Examiner**

Gregory E. Webb

**Art Unit**

1796

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-10, 16-18 and 22-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 11-15 and 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB-083)
- Paper No(s)/Mail Date 0606.0306.1105

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 11-15 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ring et al (US 6,824,794). Ring teaches treatment composition that prevent the growth of algae in water.

Concerning the claimed inorganic salt, sulfate, 1-hydroxyethylidene-1,1-diphosphonic acid, sulfuric acid, and diphosphonic, Ring, Terry A. teaches the following:

28. An aqueous solution for treating water, comprising: an amount of copper **sulfate** pentahydrate sufficient to provide algae control in a body of water to be treated; disodium ethylene diamine tetraacetic acid dihydrate; **potassium monopersulfate**; **1-hydroxyethylidene-1,1-diphosphonic acid**; about zero to about 15 wt % **sulfuric acid**; and about zero to about 33 wt % monopotassium phosphate; wherein the amount of **copper sulfate pentahydrate** in said aqueous solution does not exceed about 31.6 wt %, the amount of disodium ethylene diamine tetraacetic acid dihydrate in said aqueous solution does not exceed about 2.56 wt %, the amount of **potassium monopersulfate** in said aqueous solution does not exceed about 8.6 wt %, and the amount of **1-hydroxyethylidene-1,1-diphosphonic acid** in said aqueous solution does not exceed about 1 wt %.

Concerning the sulfuric acid and the oxalic acid, Ring, Terry A. teaches the following:

15. The water treatment agent of claim 12, wherein said buffering agent is selected from the group consisting of monopotassium phosphate, **sulfuric acid**, hydrochloric acid, nitric acid, muriatic acid, and **oxalic acid**.

Concerning the claimed pH range, Ring, Terry A. teaches the following:

Another embodiment of the buffered treatment agent of the present invention includes a concentrated solution of about 5 percent by weight copper sulfate penta-hydrate mixed with about 0.8 percent by weight Na.sub.2 EDTA dihydrate, between about zero to about one percent by weight HEDP, between zero and about 8.6 percent by weight potassium monopersulfate, and a buffered product having a **pH of about 6.8** after dilution including about 1 percent by weight monopotassium phosphate and about 0.13 percent by weight sodium hydroxide.

3. Claims 11-15 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Freese et al (US 5,575,920). Freese teaches methods and composition for inhibiting the formation of scale in cooling water systems.

Concerning the various inorganic acid salts including the sulfate, carbonate and phosphate, Freese teaches these compounds to be naturally occurring in the water supply as can be seen as follows:

Deposits in lines, heat exchange equipment, etc., may originate from several causes. For example, precipitation of calcium carbonate, calcium sulfate and calcium phosphate

in the water system leads to an accumulation of these scale imparting compounds along or around the metal surfaces which contact the flowing water circulating through the system. In this manner, heat transfer functions of the particular system are severely impeded.

Concerning the diposphonic, 1-hydroxyethylidene-1,1-diphosphonic acid, the pH of the composition, Freese, Donald T. teaches the following:

A static beaker test was used for the testing of the polymers as calcium phosphonate inhibitors. The tests were conducted by adding the treatment to a solution containing 1500 ppm Ca as  $\text{CaCO}_3$ , 10 ppm (active) **Dequest 2010 (hydroxyethylidene diphosphonic acid)** at **pH 8.5** and incubated for 18 hours at 158.degree. F. The pH was buffered with 0.01M sodium **borate**. After the incubation period, a portion of the solution was hot filtered and phosphorus concentration was determined by Inductively Coupled Plasma. The extent of the inhibition was determined by using the following:  
##EQU2## Table III summarizes the results for this test.

Concerning the nitrite, Freese, Donald T. teaches the following:

As to the other phosphonic acid derivatives which are to be added in addition to the polymers of the present invention, there may be mentioned aminopolyphosphonic acids

such as aminotrimethylene phosphonic acid, ethylenediaminetetramethylene phosphonic acid and the like, methylene diphosphonic acid, **hydroxy ethyl idene diphosphonic acid (HEDP)**, 2-phosphono-butane 1,2,4 tricarboxylic acid, and hydroxy phosphonoacetic acid. The polymers may be used in combination with yet other topping agent including corrosion inhibitors for iron, steel, copper, copper alloys or other metals, conventional scale and contamination inhibitors, and other conventional water treatment agents. Other corrosion inhibitors comprise tungstate, **nitrites**, **borates**, silicates, oxycarboxylic acids, catechols, zinc salts, molybdates and aliphatic amino surface active agents. Other scale and contamination inhibitors include lignin derivatives, tannic acids, starch, polyacrylic soda, polyacrylic amide, etc.

4. Claims 11-15 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Oshima et al (US 6,620,216). Oshima teaches composition for polishing semiconductors and hard disk substrates.

Concerning the diphosphonic, Oshima, Yoshiaki teaches the following as well as providing examples containing this compound (see table 2):

Here, in the table, **HEDP** stands for **1-hydroxyethylidene-1,1-diphosphonic acid** (commercially available from Solutia, Japan, Ltd.), and **ATMP** stands for aminotri(methylene phosphonic acid) (commercially available from Solutia, Japan, Ltd.).

Concerning the claimed pH range, sulfuric acid, and oxalic acid, Oshima, Yoshiaki teaches the following:

It is preferable that the **pH of** the polishing composition of the present invention is appropriately determined depending upon the kinds of the objects to be polished and the required properties. Although the **pH of** the polishing composition cannot be absolutely determined because it differs depending upon the materials of the objects to be polished, it is desirable that the pH generally in metal materials is acidic, preferably less than 7.0, more preferably 6.0 or less, still more preferably 5.0 or less, especially preferably 4.0 or less, from the viewpoint of increasing the polishing rate. In addition, the pH is preferably 1.0 or more, more preferably 1.2 or more, still more preferably 1.4 or more, especially preferably 1.6 or more, from the viewpoints of influence to a human body and corrosivity of the machine. Especially in the substrate for precision parts mainly made of a metal such as an aluminum alloy substrate manufactured by nickel-phosphorus (Ni-P) plating, it is preferable that the pH shows acidic, and that the pH is preferably 4.5 or less, more preferably 4.0 or less, still more preferably 3.5 or less, especially preferably 3.0 or less, from the viewpoint of increasing the polishing rate. Therefore, although the pH may be set in accordance with the purpose which is to be considered important, especially in the substrate for precision parts mainly made of a metal such as an aluminum alloy substrate manufactured by Ni-P plating, the pH is preferably from 1.0 to 4.5, more preferably from 1.2 to 4.0, still more preferably from 1.4



to 3.5, especially preferably from 1.6 to 3.0, from the total viewpoints mentioned above.

The pH can be adjusted by properly adding an inorganic acid such as nitric acid or **sulfuric acid**, an organic acid such as **oxalic acid**, an ammonium salt, a basic substance such as an aqueous ammonia, potassium hydroxide, sodium hydroxide or an amine in a desired amount.

Concerning the claimed inorganic salt, borate, sulfate, and sulfuric acid, Oshima, Yoshiaki teaches the following:

The above-mentioned peroxide includes hydrogen peroxide, sodium peroxide, barium peroxide, and the like; the permanganic acid or salts thereof include potassium permanganate, and the like; the chromic acid or salts thereof include metal salts of chromic acid, metal salts of dichromic acid, and the like; the nitric acid or salts thereof include nitric acid, **iron (III) nitrate**, **ammonium nitrate**, and the like; the peroxy acid or salts thereof include peroxodisulfuric acid, **ammonium peroxodisulfate**, metal salts of peroxodisulfuric acid, peroxophosphoric acid, peroxosulfuric acid, **sodium peroxoborate**, performic acid, peracetic acid, perbenzoic acid, perphthalic acid, and the like; oxyacid or salts thereof include hypochlorous acid, hypobromous acid, hypoiodous acid, chloric acid, bromic acid, iodic acid, sodium hypochlorate, calcium hypochlorate, and the like; metal salts include iron (III) chloride, iron (III) sulfate, iron (III) citrate, ammonium iron (III) sulfate, and the like. The preferred oxidizing agent is hydrogen peroxide, iron (III) nitrate, peracetic acid, ammonium peroxodisulfate, iron (III) sulfate,

ammonium iron (III) sulfate and the like. Especially, hydrogen peroxide is preferable, from the viewpoints of being widely used and inexpensive without depositing metal ions to the surface of the substrate. These oxidizing agents can be used alone or in admixture of two or more kinds. Among these oxidizing agent, nitric acid or salts thereof can be also used as an acid having pK1 of 2 or less or salts thereof described below.

5. Claims 11-15 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Fang et al (US 6,976,905). Fang teaches methods and compositions for polishing a memory grid or rigid disk which contain phosphate ions.

Concerning the 1-hydroxyethylidene-1,1-diphosphonic acid, Fang, Mingming teaches various compositions containing the Dequest 2010 as well as compounds containing phosphonates as can be see in table 1:

TABLE 1 Source of Molarity of Phosphate Phosphate or Relative Ion or Phosphonate  
Wt. % Polishing Composition **Phosphonate Ion** Ion [M] H.sub.2 O.sub.2 Rate Control  
none none (HAN) 1.0 Comparative 1 none none none 0.8 Comparative 2 none none 2  
1.4 Comparative 3 0.75 wt. % 0.065 none 0.65 (NH.sub.4)H.sub.2 PO.sub.4  
Comparative 4 1.5 wt. % 0.13 none 0.65 (NH.sub.4)H.sub.2 PO.sub.4 1A 1 wt. % 0.09 2  
2.1 (NH.sub.4)H.sub.2 PO.sub.4 1B 1 wt. % 0.07 2 2.3 phosphonoacetic acid 1C 1 wt.

% 0.1 2 2.1 Dequest 2010 1D 1 wt. % 0.07 2 1.7 2-aminoethyl dihydrogen phosphate  
1E 1 wt. % 0.075 2 2.0 Dequest 2006 1F 1 wt. % 0.073 2 2.0 Dequest 2066

Concerning the claimed inorganic salt, and phosphonate, Fang, Mingming teaches the following:

7. The method of claim 6, wherein the **phosphonate** ion is derived from a source of phosphonate ion selected from the group consisting of amine-containing phosphonates, imine-containing phosphonates, imide-containing phosphonates, amide-containing phosphonates, phosphonate compounds containing no nitrogen, and mixtures thereof.

Concerning the further concerning the phosphonate ion and the diphosphonic acid, Fang, Mingming teaches the following:

The **phosphonate** ion is defined by the chemical structures  $\text{RO}-\text{PO}(\text{O})_2$  or  $\text{R}-\text{O}-\text{PO}(\text{O})_2$ , wherein the structures comprise a double bond (P=O), and wherein R is an organic moiety, typically, an organic moiety selected from the group consisting of an alkyl moiety, an aryl moiety, a cyclic moiety, an aromatic moiety, and a heteroatom-containing organic moiety (e.g., an N-containing organic moiety). The phosphonate ion can be derived from any suitable source of phosphonate ion. Suitable sources of phosphonate ion include, for example, amine-containing phosphonates, imine-containing phosphonates, imide-containing phosphonates, amide-containing

phosphonates, phosphonate compounds containing no nitrogen (e.g., phosphonates containing no amine groups), and mixtures thereof. Preferably, the source of phosphonate ion is selected from the group consisting of phosphoacetic acid, 2-aminoethyl dihydrogen phosphate, aminotri(methylenephosphonic acid), nitrilotris(methylene)triphosphonic acid, **1-hydroxyethylidene-1-diphosphonic acid**, and diethylenetriaminepenta(methylenephosphonic acid), and mixtures thereof.

Concerning the claimed pH range, sulfuric acid, and oxalic acid, Fang, Mingming teaches the following:

The **pH** of the polishing system can be adjusted, if necessary, in any suitable manner, e.g., by adding a pH adjuster to the polishing system. Suitable pH adjusters include, for example, bases such as potassium hydroxide, ammonium hydroxide, sodium carbonate, and mixtures thereof, as well as acids such as mineral acids (e.g., nitric acid and **sulfuric acid**) and organic acids (e.g., acetic acid, citric acid, malonic acid, succinic acid, tartaric acid, and **oxalic acid**).

Concerning the sulfate, Fang, Mingming teaches the following:

19. The method of claim 17, wherein the oxidizing agent is selected from the group consisting of hydrogen peroxide, **ammonium persulfate**, potassium iodate, and mixtures thereof.

6. Claims 11-15 and 19-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakai et al (US 7,396,806).

Concerning the claimed inorganic salt, and sulfate, Sakai, Akimitsu teaches the following:

The reducing agent includes compounds having lower oxidation states, such as sulfites, **thiosulfates**, aldehydes, saccharides, sugar alcohols, formic acid and **oxalic acid**. Concrete examples thereof includes sulfites such as sodium sulfite and ammonium sulfite; **thiosulfates** such as **sodium thiosulfate and ammonium thiosulfate**; aldehydes such as formaldehyde and acetaldehyde; saccharides such as pentoses such as arabinose, xylose, ribose, xylulose and ribulose, hexoses such as glucose, mannose, galactose, fructose, sorbose and tagatose, heptoses such as sedoheptulose, disaccharides such as trehalose, saccharose, maltose, cellobiose, gentiobiose and lactose, trisaccharides such as raffinose and maltotriose, and polysaccharides composed of each monosaccharide; sugar alcohols such as pentitols such as arabitol, adonitol and xylitol, and hexitols such as sorbitol, mannitol and dulcitol; formic acid, **oxalic acid**, succinic acid, lactic acid, malic acid, butyric acid, pyruvic acid, citric acid, 1,4-naphthoquinone-2-sulfonic acid, ascorbic acid, isoascorbic acid, and the like, and derivatives thereof and the like.

Concerning the 1-hydroxyethylidene-1,1-diphosphonic acid, and diphosphonic, Sakai, Akimitsu teaches the following:

The chelating agent includes phosphonic acid-based chelating agents such as aminotri(methylenephosphonic acid), **1-hydroxyethylidene-1,1-diphosphonic acid** and ethylenediaminetetramethylenephosphonic acid; aminocarboxylate-based chelating agents such as ethylenediaminetetraacetates and nitrilotriacetates; hydroxyaminocarboxylate-based chelating agents such as dihydroxyethylglycine; and the like. Among them, the phosphonic acid-based chelating agent is preferable, from the viewpoint of the removability of the metal impurities.

Concerning the claimed pH range, Sakai, Akimitsu teaches the following:

**The pH of the detergent composition of the present invention at 25.degree. C. is from 3 to 12**, and the pH can properly take a preferred value within the range of 3 to 12 depending upon an object for removing a semiconductor device or a semiconductor substrate. For instance, the pH is more preferably from 3 to 7, from the viewpoint of removability of the metal impurities, and is more preferably from 7 to 12, from the viewpoint of removability of the fine particles. Here, the pH is referred to that determined by the method described in Examples set forth below.

Concerning the oxalic acid, Sakai, Akimitsu teaches the following:

The organic acid includes carboxylic acids, peracids, carbonic acid esters, thiocarboxylic acids, mercaptans, sulfonic acids, sulfonic acids, sulfenic acids, sulfuric esters, phosphonic acids, phosphatidic acids, phosphoric ester phosphinic acids, complex compounds of boric esters, and the like. Among them, the carboxylic acids are preferable, from the viewpoint of the removability of the metal impurities, and saturated polycarboxylic acids and hydroxycarboxylic acids are more preferable. Concrete examples thereof include saturated polycarboxylic acids such as **oxalic acid**, malonic acid and succinic acid; and hydroxycarboxylic acids such as gluconic acid, tartaric acid, malic acid and citric acid. Among them, **oxalic acid**, malonic acid, malic acid and citric acid are more preferable, from the viewpoint of the removability of the metal impurities.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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